COURSE SYLLABUS

COURSE TITLE:	**CAD FOR ELECTRONICS**
CLASS SECTION:	ECET 231-X01/X02
TERM:	Winter 2024
COURSE CREDITS:	2
DELIVERY METHOD(S):	In Person

For COVID-19 information please visit https://legacy.camosun.ca/covid19/index.html.

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME:	John Yang
EMAIL:	yang@camosun.ca
OFFICE:	TEC 268
HOURS:	**To be determined**

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

[INSERT TEXT HERE]

PREREQUISITE(S):	ECET 242, 260
CO-REQUISITE(S):	
EXCLUSION(S):	

COURSE LEARNING OUTCOMES / OBJECTIVES

♦ Be able to draw schematic diagrams (simple, parallel, hierarchical)

♦ Be able to find, select, and create schematic components (schematic library editor)

♦ Be able to lay out multi-layer printed circuit boards (PCB)

♦ Be able to find, select, and create PCB footprints (PCB library editor)

♦ Be able to create 3D view of a PCB

♦ Be able to manage the PCB project data

- ♦ ECET 231 Course Notes (check it with your instructor)
- ♦ Altium website *(www.altium.com)*

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

TABLE OF CONTENTS
SECTION I – The Basics of Altium Designer 23

SECTION II – Library Editors

4 ...   Schematic Library Editor *(Week 5)*

4.1   What is the schematic library editor?
4.2   Elements and tools of the schematic library editor
4.3   Three ways to create a schematic component (electrical symbol) – *Lab05*

5 ...   PCB Library Editor *(Week 6)*

5.1   What is PCB library editor?
5.2   Elements and tools of the PCB library editor
5.3   Three ways to create a PCB footprint (PCB symbol) – *Lab06*

SECTION III – Advanced Designs, Considerations, and Data Management

6 ...   PCB with multiple signal layers & multiple internal planes *(Week 7-11)*

6.1   Parallel format of a multi-channel schematic capture
6.2   Hierarchical format of a multi-channel schematic capture – *Lab07-08*
6.3   PCB layout with two signal layers (double sided)
6.4   PCB layout with two signal layers and two internal planes (power/ground)
6.5   Split internal planes – *Lab09-10*
6.6   PCB layout with more than two signal layers and/or two internal planes
6.7   Layer stack management

7 ...   PCB 3D Modeling *(Week 12)*

7.1   3D modeling has changed electronics design forever
7.2   Creating 3D component bodies in a footprint library
7.3   Embedding a 3D STEP model in a footprint – *Lab11*
7.4   3D Measuring in Altium Designer

8 ...   PCB Fabrication Documents *(Week 13)*

8.1   Bill of materials (BOM)
8.2   Gerber/ODB++
8.3   NC drill setup
8.4   Getting the layers stack right
8.5   File export centroid
8.6   PCB Panelization
8.7   How to do "Embedded Board Array" (Panelize) -- procedure
8.8   An example from Epec Engineered Technologies

9 ...   The advanced knowledge of PCB design *(Week 14)*

9.1   Schematic template management
9.2   Board layers and Colors management (PCB)
9.3   Track width management
9.4   Holes and vias management
9.5   Solder paste/mask management
9.6   Room & Classes management
9.7   Mechanical layers management

9.8   Grounding and de-coupling
9.9   EMI/EMC considerations
9.10   High speed signal considerations
9.11   Differential pair & length matching
9.12   PCB Power distribution network (PDN) analyzer – *Lab12**
9.13   BGA components layout – *Lab13**

9.14   PCB project management

Appendix: Protel 2004/DXP shortcut keys

Labs

Lab #1   **Introduction to Altium Designer**

Lab #2   **Simple logic Circuit Schematic Capture**

Lab #3-4   **Single-sided PCB Layout**

Lab #5   **Schematic Library Editor** – *create schematic symbols*

Lab #6   **PCB Library Editor** – *create PCB footprints*

Lab #7-8   **Multi-sheet Schematic Design**

Lab #9-10   **Multi-layer PCB Design**

Lab #11   **3D PCB Design**

Lab #12*   **PCB Power Distribution Network** (PDN) **Analyzer**

Lab #13*   **BGA PCB Design**   (* *when time is allowed*)

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced noticed is required. Deadlines scan be reviewed on the CAL exams page. http://camosun.ca/services/accessible-learning/exams.html

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Quizzes	5%
Labs	45%
Midterm Exam	20%
Final Exam	30%
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the Grade Review and Appeals policy for more information. http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

COURSE GUIDELINES & EXPECTATIONS

A passing grade must meet following three criteria:

1) Overall lab mark is equal to or greater than 60%;

2) Overall theoretical mark (assignments, tests, final exam) is equal to or greater than 60%;

3) The final exam mark is equal to or greater than 50%.

** Delay levy (labs/assignments): **-10% per day***

SCHOOL OR DEPARTMENTAL INFORMATION

- Electronics and Computer Engineering Department (link)

- School of Trades & Technology (link)

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit http://camosun.ca/students/.

Support Service	Website
Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the Centre for Accessible Learning (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started: http://camosun.ca/services/accessible-learning/

Academic Integrity

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit http://camosun.ca/learn/fees/#deadlines.

Grading Policy

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf for further details about grading.

Grade Review and Appeals

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the "Attendance" section under "Registration Policies and Procedures" (http://camosun.ca/learn/calendar/current/procedures.html) and the Grading Policy at http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized

Violence and Misconduct Policy: http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-3703841

Student Misconduct (Non-Academic)
Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this Syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.